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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,215	02/13/2001	W. Royall Cox	62305.79287	9704
7590		03/03/2004	EXAMINER	
Harry J. Watson		MARKHAM, WESLEY D		
Locke Liddell & Sapp LLP		ART UNIT		
2200 Ross Ave, Suite 2200		PAPER NUMBER		
Dallas, TX 75201		1762		

DATE MAILED: 03/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/782,215

Applicant(s)

COX ET AL.

Examiner

Wesley D Markham

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of the amendment filed by the applicant on 12/2/2003, in which the specification of the instant application was amended, Claims 1 and 8 were amended, Claims 9 and 11 – 20 were canceled, and a replacement sheet of drawings depicting Figure 11 was submitted. Claims 1 – 8 and 10 are currently pending in U.S. Application Serial No. 09/782,215, and an Office Action on the merits follows.

Oath/Declaration

2. The examiner acknowledges that, pursuant to MPEP 602.05, a new oath or declaration will not be required due to the omission of the date of execution by inventor Chi Guan in the instant application.

Drawings

3. This application lacks formal drawings. The informal drawings (i.e., due to the hand-written figure labels and reference numerals) filed in this application (i.e., 7 sheets, 12 figures, filed on 2/13/2001) are acceptable for examination purposes. When the application is allowed, applicant will be required to submit new formal drawings.
4. The objection to Figure 11, set forth in paragraph 5 of the previous Office Action (i.e., the non-final Office Action mailed on 6/4/2003), is withdrawn in light of the

Art Unit: 1762

replacement sheet of drawings depicting Figure 11 submitted by the applicant on 12/2/2003.

Specification

5. The objections to the specification, set forth in paragraphs 6 – 7 of the previous Office Action, are withdrawn in light of the applicant's amendment in which (1) generic terminology corresponding to the trademarks present in the instant application was inserted into the specification, and (2) Claim 9 was canceled, thereby eliminating the "antecedent basis" objection raised by the examiner.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order

Art Unit: 1762

for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. The rejection of Claims 1 – 13 and 15 – 20 under 35 U.S.C. 103(a) as being unpatentable over Canon KK (JP 11-142611 A), referred to hereinafter as Canon, in view of Hayes et al. (USPN 5,707,684), set forth in paragraphs 11 – 13 of the previous Office Action, is withdrawn in light of the applicant's amendment in which Claims 9 and 11 – 20 were canceled and independent Claim 1 (from which Claims 2 – 8 and 10 depend) was amended to require, in part, holding the formed microlens at an elevated temperature for a period of time to allow diffusion of the cap portion into the base portion and diffusion of the base portion into the cap portion to create the gradient index of refraction in an inter-diffusion zone between the cap portion and the base portion (i.e., as opposed to simply holding the formed microlens under conditions permitting inter-diffusion of the cap portion and the base portion to create the gradient index of refraction in the formed microlens). Specifically, the examiner maintains that, although the majority of the discussion in Canon describes the diffusion of the second, higher refractive index resin into the first, lower refractive index resin (i.e., "diffusion of the cap portion into the base portion", in terms of the applicant's claims), an amount of inter-diffusion (i.e., the additional diffusion of the lower refractive index resin (the base portion of the microlens of the combination of Canon and Hayes et al.) into the higher refractive index resin (the cap portion of the microlens of the combination of Canon and Hayes et al.)) also necessarily occurs

Art Unit: 1762

because the second, higher refractive index resin is deposited on and permeates with the first, lower refractive index resin in a state in which both resins are not cured / hardened (see paragraphs [0013], [0015], and Examples 1 and 2 of Canon). In other words, the diffusion in the process of the combination of Canon and Hayes et al. would not simply occur in one direction, but in both directions due to the uncured, unhardened nature of the two polymeric solutions that are in contact with each other. However, the examiner notes that the combination of Canon and Hayes et al. alone is not sufficient to render amended Claim 1 obvious because the aforementioned combination of references does not reasonably suggest holding the microlens at an elevated temperature to diffuse the cap portion into the base portion, and vice versa.

9. The rejection of Claim 14 under 35 U.S.C. 103(a) as being unpatentable over Canon KK (JP 11-142611 A), referred to hereinafter as Canon, in view of Hayes et al. (USPN 5,707,684), and in further view of Weitzel et al. (USPN 6,027,672), set forth in paragraph 15 of the previous Office Action, is withdrawn in light of the applicant's amendment in which Claim 14 was canceled.
10. Claims 1 – 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Canon KK (JP 11-142611 A), referred to hereinafter as Canon, in view of Hayes et al. (USPN 5,707,684), and in further view of Hamblen et al. (USPN 5,143,659) and Yamashita et al. (USPN 6,185,353 B1).
11. Specifically, the combination of Canon and Hayes et al. teaches all the limitations of **Claims 1 – 8 and 10** as set forth in paragraphs 12 – 13 of the previous Office

Art Unit: 1762

Action, except for a method wherein (1) the formed microlens (i.e., with the high-refractive index cap portion on top of the low-refractive index base portion – see paragraph 12 of the previous Office Action) is held at an elevated temperature for a period of time to allow diffusion of the cap portion into the base portion and diffusion of the base portion into the cap portion to create the gradient index of refraction in an inter-diffusion zone between the cap portion and the base portion of the microlens, and (2) the gradient in the index of refraction increases from the index of refraction of the base portion to the index of refraction of the cap portion of the microlens. However, Hamblen et al. teaches that, in the art of making microlenses having a gradient index of refraction (Abstract, Figures 4A – 4C, Col.1, lines 10 – 29, and Col.3, lines 8 – 10), it is desirable to hold two monomeric compositions, each having a different refractive index, in contact with each other for a period of time sufficient to allow the diffusion of one composition into the other, and vice versa (i.e., inter-diffusion) in order to obtain a desired index of refraction gradient (Figures 4A – 4C, Col.5, lines 26 – 68, Col.6, lines 1 – 19, and Table 1). The extent of the inter-diffusion, and therefore the extent of the gradient, is determined by the inter-diffusion time (Col.6, lines 20 – 29). After the aforementioned inter-diffusion, the microlens is cured (Col.6, lines 20 – 29). Yamashita et al. teaches that, in the art of inter-diffusing two polymers, each having a different refractive index, it is desirable to heat-treat the polymers to effect the inter-diffusion process (Col.7, lines 54 – 67, and Col.8, lines 1 – 26). Additionally, Yamashita et al. teaches that the refractive index profile (i.e., the profile obtained by the inter-diffusion process) can be controlled by varying the heat-

treating temperature (Col.8, lines 40 – 43). Therefore, it would have been obvious to one of ordinary skill in the art to hold the formed microlens (i.e., with the high-refractive index cap portion on top of the low-refractive index base portion – see paragraph 12 of the previous Office Action) of the combination of Canon and Hayes et al. at an elevated temperature (as taught by Yamashita et al.) for a period of time to allow diffusion of the cap portion into the base portion and diffusion of the base portion into the cap portion to create the gradient index of refraction in an inter-diffusion zone between the cap portion and the base portion of the microlens (as taught by Hamblen et al.) with the reasonable expectation of successfully and advantageously producing gradient index microlenses by a process in which the amount of inter-diffusion between the cap and base portions, and therefore the overall refractive index gradient, can be determined and effectively controlled (i.e., by controlling the inter-diffusion time (as taught by Hamblen et al.) and the heat-treating inter-diffusion temperature (as taught by Yamashita et al.)). The ability to control the refractive index gradient of the microlenses would clearly be beneficial in the process of the combination of Canon and Hayes et al., as Canon desires to form various different refractive index distributions (paragraphs [0018] and [0028]). By performing the process reasonably suggested by the combination of Canon, Hayes et al., Hamblen et al., and Yamashita et al., the gradient in the formed microlens would inherently increase from the index of refraction of the base portion to the index of refraction of the cap portion, as claimed by the applicant (i.e., because the aforementioned process involves inter-diffusing a low-refractive index base portion

Art Unit: 1762

with a high-refractive index cap portion to form a refractive index gradient).

Additionally, please note that the combination of Canon, Hayes et al., Hamblen et al., and Yamashita et al. does not explicitly teach that (1) the microlenses have a generally uniform axially gradient index of refraction, and (2) the formed microlens has a reduced focal spot as compared to a non-gradient index microlens of the same character. However, the gradient obtained by the applicant's claimed process and the properties associated with that gradient (i.e., the reduced focal spot) appear to be solely a function of the process used to form the microlenses. As the combination of Canon, Hayes et al., Hamblen et al., and Yamashita et al. reasonably suggests performing all of the applicant's claimed process steps and limitations, the microlenses produced by the process suggested by the aforementioned combination of references would have inherently possessed the physical properties claimed by the applicant (i.e., the generally uniform axially gradient index of refraction and reduced focal spot) unless essential process steps and/or limitations are missing from the applicant's claims.

Response to Arguments

12. Applicant's arguments filed on 12/2/2003 have been fully considered but they are not persuasive. Specifically, the applicant's arguments have been addressed and rendered moot in view of the new grounds of rejection presented above.

Art Unit: 1762

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1762

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wesley D Markham
Examiner
Art Unit 1762


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